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A. I. BERG, 1951 WINNER OF THE A. S. POPOV GOLD MEDAL

Prof I. Dzhigit

The A. S. Popov Gold Medal, awarded annually on "Radio Day" for outstanding scientific work and inventions in the field of radio, was awarded this year by the Presidium of the Academy of Sciences USSR to Aksel' Ivanovich Berg. The outstanding scientific services of Academician Berg in the field of experimental and theoretical radio engineering, and his organizational, public, and pedagogical activity, have made him one of the most important Soviet scientists.

One of the basic problems to which Berg devoted many years of scientific activity was the development of a theory and methods for the engineering design and calculation of vacuum-tube oscillators. The results of Berg's theoretical and experimental studies in the field of generation and stabilization of oscillations in vacuum tubes have been published in many articles and books.

In his first scientific paper, "The Study of Double-Grid Tubes With the Help of a Vacuum-Tube Voltmeter," published in 1926, Berg studied the load characteristics of the first Soviet radio tubes with a screen grid and determined their best operating conditions. In the paper, "Calculation of a Vacuum-Tube Oscillator With a Flat Plate-Current Pulse Form," published in 1931, Berg showed that the flat plate-current pulse form was the most efficient for obtaining maximum power from the vacuum-tube oscillator and gave a detailed analysis of oscillators in this type of operation. In the article "Operation of a Vacuum-Tube Oscillator With a Mixed Load," he cited a method, checked experimentally, for calculating the change of plate power dissipation of an oscillator tube as a function of the detuning of its circuits. This study of an oscillator working into a detuned load remains to this day the basis for the calculation of ultrahigh-frequency triode oscillators.

In the article "A Theoretical Study and Analysis of a Vacuum-Tube Oscillator Operating Under Overvoltage Conditions," published in 1934, Berg analyzed in detail the operation of a vacuum-tube oscillator with a distorted plate

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current pulse form and derived the dependency of the power and efficiency upon the degree of overvoltage. In the article he showed that undistorted plate modulation could be obtained when the modulated tube was operating under overvoltage conditions. He also developed the theory and methods for the analysis of plate modulation under low-voltage conditions. In connection with the need of planning organizations for handbooks for the calculation of radio transmitting equipments, Berg worked out and published tables for rapid determination of the amplitudes of harmonics in complex plate current pulses.

The extensive development of radiotelephony and the need for correct selection of the power and operating conditions of the oscillator and modulator stages impelled Berg to make a number of studies, the results of which were published in 1935 in the following articles: "Development of the Theory and Calculation of Plate Modulation for Independent Excitation," "Development of the Theory and Calculation of Grid-Bias Modulation," and "Development of the Theory of Grid-Bias Modulation and Amplification of Modulated Oscillations."

Berg's subsequent works on the theory and calculation of vacuum-tube oscillators were: "Development of the Theory of a Cosinoidal Pulse," "Distribution of Current Between the Plate and Grid in Triodes," and "Analysis of the Operation of Triodes With Consideration for Grid Current," all published in 1937. A further development of these studies was the extension of the methods developed therein to tetrode and pentode oscillator tubes. The theory of tetrode and pentode oscillator tubes was worked out in detail by Berg in 1940 - 1943.

A number of Berg's early studies were of radio reception problems. In the article "A Theoretical and Experimental Study of Grid Detection," published in 1925, he derived the theoretical dependency of the rectified current and voltage of triodes operating as grid detectors upon their parameters and the load.

The book "A Course on the Principles of Radio Engineering Calculations," published in 1929, with a second edition in 1930, was a result of Berg's long work on engineering methods for the calculation and design of radio receiving equipment. This course served as a basic text in higher educational institutions for many years.

In addition to scientific works and studies, Berg wrote a number of textbooks and manuals. The first of these was a small course for naval radiotelegraphers, published in 1924 under the title "Vacuum Devices" (electron tubes). As a result of teaching a course in 1925, the manual "Cathode Tubes" was published.

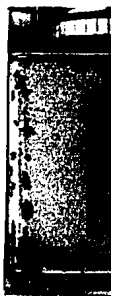
Publication of the textbook "The General Theory of Radio Engineering" resulted from a course in radio engineering taught at the Naval Engineering College in 1924 and 1925. Berg's most important work of this period was "The Theory and Calculation of Vacuum-Tube Oscillators," published in 1932, with a second edition in 1935. This book, adopted as a standard textbook for higher educational institutions of the USSR, was for many years the basic text in this field. The special monograph "The Theory of Self-Excitation, Stability, and Crystal Stabilization of Vacuum-Tube Oscillators" was written from lectures which Berg read in 1932, 1933, and 1934 at the Electrical Engineering Institute.

Berg has also been active in the study of the history of science. He fought the attempts of certain bourgeois historians to belittle or refute A. S. Popov's priority in inventing the radio. On this problem, he wrote the pamphlet "A. S. Popov and the Invention of Radio," published in 1935, and "A Symposium of Documents and Materials on the Invention of Radio by Popov," published by the Academy of Sciences USSR on the 50th anniversary of radio.

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Academician Berg has combined important scientific research work with an active public life. From 1922 to 1925, he was a member of the Presidium of the Naval Engineering Society; from 1930 to 1932, he was a member of the Presidium of the Scientific and Technical Section in the Friends of Radio Society of Leningrad; from 1935 through 1937, he was president of the Radio Section of the Society of Electrical Engineers and Electric Power Engineers; from 1934 through 1937, he was a deputy to the Petrograd Rayon Soviet of Leningrad. In November 1936, Berg was elected a deputy to the Fifth Congress of Soviets of Leningrad Oblast. Since the establishment of the Stalin Prizes, Berg has been a member of the Stalin Prize Committee on Science, Inventions, and Basic Improvements in Industrial Production. He is a member of the Scientific Council on Radio Physics and Radio Engineering of the Academy of Sciences USSR and has been chairman of this council since March 1951. In addition, Berg is now president of the Administrative Board of the All-Union Scientific and Technical Society of Radio Engineering and Electric Communications imeni A. S. Popov. He has also done much work in furthering the radio amateur movement in the USSR, and is chairman of the Exhibition Committee for the yearly amateur exhibitions. Berg is also the editor of scientific and technical journals. He is a member of the scientific councils of many scientific research institutes, higher educational institutions, commissions of experts, etc.



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